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Alcohol and noncommunicable diseases: monitoring the Brazilian population according to population surveys

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Introduction

The consumption of alcoholic beverages is an accepted and encouraged behavior in most cultures, being associated with festivities, celebrations, religious ceremonies, etc. (WHO, 2002, 2008). Although alcohol use is deeply rooted in the culture of many societies, it is estimated that about 45% of the adult population has never consumed alcoholic beverages. Among women, this percentage rises to 55% (Id., 2011).

According to international data from the Pan American Health Organization (PAHO), there is a high degree of variation in alcohol consumption worldwide. On average, per capita consumption was estimated in six liters per year, where the highest use was in the European region (12.2 liters) and the lowest in the Middle East (0.6 liters). Countries with higher income have higher per capita consumption (around 10 liters) than low- and middle-income countries (around three to four liters). The Brazilian average consumption is about 8.8 liters per capita (Monteiro, 2007).

It is estimated that alcohol-related problems result in an annual cost ranging from 0.5% to 2.7% of Gross Domestic Product (GDP) of different countries (WHO, 2002, 2008, 2011a). Heavy drinking is an important public health problem, influencing morbimortality. The World Health Organization (WHO) estimates that, each year, there are approximately 2.5 million deaths associated with the use of alcohol, accounting for 3.8% of all deaths worldwide, of which 320,000 die young, aged between 15 and 29 years. More than half of these deaths occur from chronic diseases, including cancer, cardiovascular diseases and liver cirrhosis. Among young people, external causes are the most frequent (Id., 2011a).

Their influence on health is also related to different patterns of alcohol consumption. Thus, chronic consumption can cause harm and dependence, resulting in mental, hepatic and cardiovascular diseases, neoplasia, among others. The problems arising from the episodic and acute use are also important risk factors for violence (assaults, homicides, and suicides), transport and labor accidents, etc. (WHO, 2011a; Monteiro, 2007).

The effects of alcohol in the body vary according to the speed and frequency of ingestion, metabolism, genetic vulnerability, sex and lifestyle. Once absorbed, it reaches all parts of the body, leading to decreased reflexes and motor coordination. The initial effect promotes a state of euphoria and disinhibition, but if ingested in larger amounts, the opposite occurs, causing depression of the nervous system, varying in intensity depending on the amount consumed and the individual sensibility (WHO, 2002, 2008, 2011a; Monteiro, 2007; Mascarenhas et al., 2009).

Due to the pleasant effect that occur when ingested in minor doses, drinking stimulates repetition and thereby dependence. Alcohol alters reflections even when small quantities are ingested. The effects vary according to the amount consumed. These effects may alter the ability to drive, for example, becoming a potent risk factor for traffic accidents (WHO, 2008; Monteiro, 2007; Mascarenhas et al., 2009).

There are several revisions and evidence on the relationship between alcohol consumption and cancer risk, documented since the 1990s (Doll et al., 1993; Duffy; Sharples, 1992). Alcohol is a risk factor for the development of some types of cancer, such as tumors in the oral cavity (mouth), pharynx, larynx, esophagus, colorectal, liver, pancreatic and breast. Worldwide, 3.6% of all cancers are attributable to drinking (WHO, 2011a; Doll et al., 1993; Duffy; Sharples, 1992).

The mechanism of action of the alcohol (ethanol) in tissues and the development of cancer are not fully understood (WHO, 2011a; Doll et al., 1993; Duffy; Sharples, 1992). Some evidence suggest that it may act in several ways, promoting changes in the DNA (Deoxyribonucleic Acid) of the cell, resulting in damage to cells and tissues. In the intestine, intestinal bacteria would transform ethanol into acetaldehyde, which is a carcinogenic substance for laboratory animals. Alcohol may also interact with other substances with carcinogenic potential, such as nicotine and other tobacco

substances. Thus, the combined use of tobacco and alcohol enhances oral, throat and esophagus tumors. Alcohol can lead to direct damage to the liver, causing inflammation and cicatrization, changing the liver metabolism and promoting great systemic effects, besides reducing the absorption of nutrients from foods such as folate, which enhances breast and colorectal cancer. Other deleterious effects consist in affecting estrogen and other hormones, increasing estrogen levels, which could rise the risk of breast cancer. Also, there could be an increase on the calories consumed, leading to obesity, which is another risk factor for several neoplasias (WHO, 2011a; Doll et al., 1993; Duffy; Sharples, 1992).

The relationship between alcohol consumption and ischemic heart disease and brain vascular disease is complex, depending on the amount ingested and the pattern of alcohol consumption. There are numerous controversies regarding the possible benefits of alcohol. Some epidemiological data in high-income countries suggest that low alcohol consumption could result in benefits in the evolution of cardiovascular disease in some segments of the population (Corrao et al., 2004; Mukamal et al., 2010; Rehm et al., 2010; Ronksley et al., 2011), but the possible beneficial effects tend to disappear at high consumption patterns (Bagnardi et al., 2008; Roerecke; Rehm, 2010).

Alcohol intake for prolonged periods can increase blood pressure, cardiovascular mortality and mortality in general (Sociedade Brasileira de Cardiologia, 2006). Alcohol is, by definition, the main cause of alcoholic cardiomyopathy, besides being an important causative factor of hypertension and hemorrhagic stroke (English et al., 1995). Moreover, alcohol consumption has harmful effects on blood pressure, heart failure, arrhythmia and hemorrhagic stroke, regardless of the consumption pattern (Rehm et al., 2010).

Low levels of alcohol consumption may have a protective effect against strokes (CVA), especially ischemic, due to its effect on HDL cholesterol, platelet stickiness and other thrombophilia factors (Sociedade Brasileira de Cardiologia, 2006). It also should be pointed out that some studies have led to opposite results on the relationship between alcohol use and stroke. In a comprehensive review, English et al. (1995) found 21 studies, which showed the relationship between alcohol consumption and

increased stroke risk, but eight studies did not indicate any connection. In another large study, Camargo & Rimm (1996) concluded that the evidence of cardiovascular protective effects associated with moderate alcohol consumption is ambiguous. On the contrary, other studies concluded that there is a direct relationship between alcohol consumption and increased risk of stroke (Wannamethee; Shaper, 1996; Yuan; Ross; Gao, 1997).

Therefore, evidences of correlation of the protective effect when alcohol consumption is low are limited and controversial. In addition, alcohol-related harm in the case of cardiovascular diseases (CVD) are widely confirmed (Sociedade Brasileira de Cardiologia, 2006; Xin et al., 2001). As a result, the orientations of the Brazilian Hypertension Guidelines have been, among those who already drink alcohol moderately, to not exceed 30 g of ethanol per day for men and half that amount for women; preferably not regularly. For those who do not have the habit the use of alcohol is not recommended (Sociedade Brasileira de Cardiologia, 2006).

Regarding the effects of alcohol on the brain of children and adolescents, there are countless evidence of harm. Immaturity of the brain confers vulnerability to the young, especially if you have a genetic predisposition (Committee on Substance Abuse, 2010). The use of alcohol and other drugs can affect brain maturation. As a result, adolescents addicted to alcohol and other drugs may have reduced hippocampal volume and an impact on memory and learning skills. Neurophysiological studies have shown that the frontal lobe is essential for functions such as answers to inhibition, emotional regulation, planning and organization, and that the development and maturation of that part of the brain continue during adolescence until adulthood. The lateral lobe is associated with language and hearing and these functions are largely matured in adolescence. In turn, the occipital, parietal and temporal lobes feature small changes in these stages of life and are less affected (Committee on Substance Abuse, 2010). Therefore, the use of alcohol in this phase brings very harmful consequences.

There are countless evidence available regarding the effectiveness and cost-effectiveness of interventions to reduce the harmful use of alcohol (Anderson; Chisholm; Fuhr, 2009; Who, 2009). The most effective measures according to WHO are (WHO, 2008):

i. The increase in excise duties on alcohol consumption;
ii. The regulation of the availability of alcohol beverages, including the definition of minimum age for buying drinks; restrictions on the number of items purchased; blackout periods and sale times. For example, sales ban during the night and, when appropriate, government monopoly on retail sales;
iii. Alcohol exposure restrictions, controlled by regulations or by prohibiting global advertising of alcohol;
iv. Drinking and driving penalties, including intense monitoring, conducting alcohol tests on drivers with low or zero blood alcohol concentration limits, and no tolerance of alcohol consumption, especially for young drivers.

Other measures were tested, but they did not reach a good level of evidence in controlling alcohol. This is the case of educational and isolated measures in the classroom, mass campaigns in the media and warning labels and messages to consumers on products. However, the educational messages and information campaigns can increase the acceptance of these measures among the population when paired with control and restrictive actions (WHO, 2008).

In 2014, in the Global Action Plan for the Prevention and Control of NCDs, the WHO and the Member States adopted the goal of reducing alcohol consumption by 10% among adults and adolescents - or reduce morbimortality caused by alcohol (WHO, 2013). For this purpose, it is necessary to institute measures and public policies that promote advances, and establish monitoring systems of alcohol consumption and morbimortality patterns. Comparative studies on alcohol consumption are a major challenge due to the difficulty of standardized questionnaires, containers with different measurement sizes and alcohol concentration on beverages (WHO, 2002). The Ministry of Health in Brazil in the last decade has performed numerous population surveys aimed at monitoring alcohol consumption among the Brazilian population. For example: a) telephone survey about risk and protective factors for chronic diseases (Vigitel) (Brazil, 2013a) conducted in adults ≥18 years of age; b) National Survey of School Health (PeNSE) (IBGE, 2009), conducted by the Brazilian Institute of Geo-

graphy and Statistics (IBGE) in partnership with the Ministry of Health. They interviewed students from 13 until 15 years old of the 9th year (8th grade) of secondary school; c) Surveillance System for Violence and Accidents (VIVA), held every three years since 2006 in hospital emergencies, interviewing patients suffering from external causes. Includes questions about alcohol use (BRAZIL, 2013b); d) The National Health Research, interviewing approximately 64,000 households across the country about the use of alcohol (IBGE, 2014). These surveys aim to support the design of public policies for health promotion and disease prevention.

The current study aims to analyze these four surveys regarding the use of alcohol and thus provide insights to the design of public policies to control the harmful use of alcohol.

Methodology adopted by the studies

Vigitel data were analyzed (Brazil, 2013a) in adults (≥18 years) living in the capitals of the 26 Brazilian states and the Federal District that have landline, totaling 54,000 interviews each year. Vigitel uses probability sample in two stages: 1) randomly select 5,000 telephone lines in each city, followed by a new draw and the organization of 25 replicates (subsamples) of 200 lines; 2) draw an adult resident (> 18 years) of the household to answer the interview. Post-stratification weights are assigned to equalize the sociodemographic composition of the adult population of the city to the population census, according to sex, age and education. For more methodological details, see specific publications. In this study, the following concept was adopted: abusive alcohol consumption (drinking four or more drinks for women or five or more drinks for men in one occasion within the last 30 days). A dose of alcoholic drink is a shot of liquor, a can of beer or a glass of wine. It is also described the nine-year trend (2007-2013) of this indicator, using linear regression.

PeNSE (IBGE, 2009) was held with school sample of the 9th grade, in two stages. In the first stage, the schools were selected; in the second, classes were selected, interviewing all students in selected classes. The sample was calculated to provide estimates of proportions (or prevalence)

of some characteristics of interest in each of the geographic areas (the 27 state capitals, including the Federal District), with a maximum error of 3%. The data collection instrument was developed from models used in other surveys on behaviors of adolescent students in national and international levels, adapted to the Brazilian reality. The questionnaire was administered to all students in selected classes via a laptop computer operated by the student, known as Personal Digital Assistant (PDA). Then data were analyzed referring to about 109,000 students in 2012. The current study describes the following indicators: a) the testing of one alcoholic drink in life; b) the occurrence of episodes of drunkenness in life; c) the regular consumption of alcohol or during the last 30 days; d) problems with family or friends due to consumption of alcohol (like losing classes, hurting someone or getting into a fight); e) the families' perception if the teenager comes home drunk, taking into account gender and type of school (public or private). It also describes the daily number of doses of alcohol ingested in the last 30 days and the means of obtaining alcohol. It was also presented a study associating the consumption of alcohol and other substances and the behavior of families, such as the supervision of parents and their participation in the lives of children, having their meals together, knowing where the child is in his free time or if he misses classes (Malta et al., 2014a).

The VIVA Survey was conducted in 2011 in public emergency hospitals selected in the state capitals and the Federal District and interviews were collected in 25 capitals, 79 emergency establishments, in different shifts, according to the frequency of attendance of external causes (Malta et al., 2014a). Shifts were drawn in periods of 12 hours, day or night, in the months from September to November 2011. Interviews were conducted by trained technicians using a standardized form, whose variables were distributed according to the following parts: data from the person attended; data of the occurrence (intentionality, type of event, time and place of the occurrence, alcohol use statement); types of accidents and violence; nature of the injury; part of the body affected; and evolution of cases. During the interviews, the interviewer was asked to note if he suspected of alcohol use by the person attended, noting signs like ethyl faces, typical alcohol breath, abnormal gait, loss of balance, among others, and

to ask about the use of alcohol in the six hours prior to the occurrence of the event. The reported events were classified according to the intention into two groups: accidents and violence. Accident was defined as unintentional and avoidable event, causing physical and emotional injuries, in the household or outside, such as work, school, sports and leisure. This group also include transportation accidents, falls, burns, cuts, and falling objects on people. Violence was defined as the use of force against a group or community, which has resulted or has any possibility of resulting in injury, death, psychological harm, developmental disability or deprivation. Under that denomination were included suicide attempts, abuse and assaults (Mascarenhas et al., 2009). In this study, we analyzed the occurrences of accidents and violence according to the report of alcohol consumption by the person who suffered the injury, among victims aged 18 years or older, according to sex, age, education, race/color and type of occurrence.

The National Health Research was a household survey conducted in Brazil in 2013 by the Brazilian Institute of Geography and Statistics, in partnership with the Ministry of Health and the Oswaldo Cruz Foundation (Fiocruz). The initial sample gathered about 81,000 households. Of this total, interviews were conducted in 64,348 households, resulting in a non-response rate of 8.1% (IBGE, 2014). The interviews were conducted between August 2013 and February 2014 with the use of handheld computers - PDAs (Personal Digital Assistance) - programmed to evaluate the received values. Questions on alcohol were included. Here, we will examine the abusive consumption of alcoholic beverages.

In all studies, a statistical analysis was performed using Stata (Statacorp, 2009). The National Commission for Research Ethics of the Ministry of Health of Brazil approved the projects.

Results of the studies analyzed

VIGITEL 2013

The following results related to alcohol consumption were found. In the adult population of the 27 cities studied, the frequency of the abuse of alcohol in the last 30 days was 16.4%, almost three times higher in men

(24.2%) than in women (9.7%). In both sexes, the abuse of alcohol was more frequent among younger individuals and tended to increase with the level of education (Table 1). The change in consumption varied from 12% in Curitiba to 22% in Aracaju. (Figure 1). The trend remained stable over the past eight years for men, women and total (Figure 2). Alcohol abuse and drinking and driving reduced significantly between 2007 and 2013 in both sexes and among men (Figure 3).

PeNSE 2012

Of the 109,000 students interviewed, 50.3% experienced one dose of alcoholic beverages or more (95% CI 49.0 - 51.6), while consumption was higher among girls (51.7%) (95% CI 50.8 - 52.6) than among boys (48.7%) (95% CI 46.6 - 50.8) and in public schools (50.9%). The consumption of alcohol in the last 30 days was 26.1% (95% CI 24.5 - 27.7) in Brazil, 25.2% (95% CI 23 - 27.5) for males and 26.9% (95% CI 25.7 - 28.0) for females. Episodes of drunkenness were reported by 21.8% (95% CI 21.1 - 22.5) of students, being more frequent among boys (22.8%) (95% CI 22.0 - 23.7) than girls (20.9%) (95% CI 20.1 - 21.6). These episodes were more frequent in public schools (22.5%) (95% CI 21.7 - 23.2) than in private schools (18.6%) (95% CI 17.8 - 19.3). As for the perception of the students about the family's reaction if they got home drunk, 92.2% (95% CI 92.0 - 92.3) of teens said their parents would care much; 10% (95% CI 8.9 - 11.1) reported having problems with family or friends - for example, missing classes or being involved in fights (Table 3).

Among the students who consumed alcohol in the last 30 days, the most common way to get a drink was at parties (36%), especially for girls; with friends (20.9%); or shopping at the market, at a store, bar or supermarket (16.6%), especially among boys (21.9%). Other 9.1% consumed in the last 30 days alcoholic beverage obtained at home (Figure 4).

Another study by PeNSE investigated the association between the consumption of psychoactive substances (tobacco, alcohol and illicit drugs) and family protective factors (Malta et al., 2014a). Alcohol consumption in the last month encompassed 26.1% of 109,000 adolescents. Some of the factors that prevented the use of psychoactive substances are linked to the protection characteristic of the family context, as living with

parents, having the meal together and parental supervision (parents know what the child does in his spare time). In contrast, skipping school without telling their parents proved to be a risky behavior for the use of tobacco, alcohol and illicit drugs, increasing the risk of the use of tobacco in 1.8 times, 1.98 times for alcohol and 2.7 times for drugs. This points to the importance of family and school in the protection of adolescents and to reduce risk behaviors (Malta et al., 2014a) (Figure 5).

VIVA Survey 2011

Those who admitted the use of alcohol reached 14.9% in 2011 among the total assistance for people aged ≥18 years, ranging from 11.4% for victims of accidents to 44.1% for victims of violence.

Among the attendance of injuries, the highest proportions were observed in calls for transport accidents (19.6%) and falls (10.2%). Burns and other types of accidents (suffocation, choking, foreign body, drowning, etc.) had ratios of 3.5% and 5%, respectively.

For calls for violence, the occurrence ranged from 33.8% in the case of self-harm to 45.2% for assault/abuse (Table 4).

Taking into account the sex of the victim, the declaration of alcohol intake was two to three times more common among men compared to women attended by accidents and violence (Table 4).

Regarding the age of the victims, the highest proportions of alcohol intake were observed among accident victims aged 18-29 years old (12.7%). The maximum proportion among victims of violence was in the age group from 30 to 59 years (45.7%).

As for the race/skin color, black people (black and mulatto) had the highest proportions of alcohol use for the total attendance (16.9%). In addition, it is worth mentioning the proportion observed among yellow skin people and indigenous (14.9%). It was also noticed a higher frequency of alcohol intake among people with lower levels of education (Table 4).

Conclusions

Consuming excessive amounts of alcohol in a short period is a practice known in international literature as binge drinking or heavy episodic drinking. This practice is more dangerous and often associated with a range of physical, social and mental problems. VIGITEL and PNS showed that among adults this consumption pattern stands out among young men from 18-29 years. Similar features were also identified in the VIVA Survey, in which there was a predominance of alcohol consumption among men and young victims of accidents and violence.

Among the many problems resulting from alcohol use, motor vehicle accidents (including cars, motorcycles, and trucks) occupy a prominent place. For every 10 car accidents, 1.5 had reference to alcohol consumption. Drinking and driving increases the risk of traffic accidents (WHO, 2008; Monteiro, 2007; Mascarenhas, 2009). The blood alcohol concentration produces several neuromotor changes in different concentrations. Even low doses (0,3dcg/l or 1 dose) decrease the attention and give a false perception of speed, euphoria and difficulty to discern different luminosities (Monteiro, 2007; National Highway Traffic Safety Administration, 2008).

The pattern of alcohol consumption analyzed here, the binge drinking, is when there is an intake of five or more standard drinks (one alcoholic drink or equivalent contains about 12 grams of pure alcohol, and five doses would add about 60g) for men and four or more doses for women (about 48g). Binge drinking can result in events such as violence, traffic accidents, accidents in general, alcohol intoxication, unsafe sex, unplanned pregnancies, sexually transmitted diseases and HIV (Monteiro, 2007). In most Latin American countries, including Mexico, Brazil, Peru, Bolivia, Uruguay, Costa Rica and Chile, binge drinking is particularly high, especially among young people, as described here.

The VIVA Survey shows that the relationship between alcohol and violence/abuse is even more serious because in about half of cases there was reference to alcohol consumption. Studies indicate a relationship between the restriction of sale of alcoholic beverages and closing bars at certain night shifts with the reduction of homicides (Duailibi, 2007). Such evidence underlied WHO and Member States in the adoption of resolu-

tions on political and legal restriction measures to alcohol consumption and vehicle direction, alcohol advertising control, ban on sales to minors and restriction of outlets of alcohol (WHO, 2008).

Another major point of consideration are the alcohol data among students. About half of the adolescents aged from 13 to 15 years have taken at least one dose of alcohol, a quarter presented episodes of drunkenness and 9% reported having had alcohol problems (Malta et al., 2014b). These data show the extent of the problem of such a sensitive topic with adolescents. The study calls attention to the ease with which young people interviewed had access to alcohol at parties, bars, shops and at their own home (Malta et al., 2014b, 2014c).

Associated with genetic predisposition, the use of alcohol in this phase of life can also affect brain maturation and reduce hippocampal volume - and hence learning and memory (Committee on Substance Abuse, 2010). The use of alcohol in adolescence may result in traffic accidents, homicides, suicides, depressive disorders, anxiety, fights at school, property damage, early sexual initiation and risk attitudes, such as not using condoms, multiple partners and pregnancy (Cooper, 2002; Stueve; O'Donnell, 2005), and lead to excessive use in adulthood (Malta et al, 2011).. Furthermore, alcohol consumption is a risk factor for the use of other drugs, such as tobacco and illegal drugs (Iglesias et al., 2007).

Constant exposure of adolescents to media directed to beverage advertising was associated with alcohol consumption among teenagers (Vendrame et al., 2009). PeNSE studies show that the higher education of the parents, the greater the risk of alcohol consumption in adolescence (Malta et al., 2014b).

Data from PeNSE show the spread of alcohol among adolescents, besides frequent drunkenness, ease of purchase in shops and, worse, access at home, increasing the chances of involvement in episodes of risk (Malta et al., 2014b). Studies show that when parents are more aware of the activities carried out by their children, kids have less involvement with alcohol, drugs and tobacco (Malta et al., 2011, 2014a, 2014c; Paiva; Ronzani, 2009). The attention of parents to the attitudes and behaviors of the children acts as a protective factor for drinking, tobacco and drugs (Malta et al., 2014a, 2014c).

In May 2010, the World Health Assembly adopted the Global Strategy to Reduce Harmful Use of Alcohol (WHO, 2008) and urged Member States to incorporate their decisions. The strategy sets out guiding principles for the development and implementation of alcohol prevention policies at all levels and sets priorities for global action. Moreover, it urges a set of policy choices for the implementation at national level. The strategy recommends 10 points, such as: leadership and commitment to the subject; structuring healthcare advice and treatment; involving the community in identifying needs and solutions; establishing control policies of the alcohol level, surveillance, and policies; reducing the availability of alcohol; regulating the commercialization of alcoholic beverages; establishing pricing policies; reducing the negative consequences of alcohol consumption and its poisoning; reducing the impact of illegal and informal alcohol on public health; establishing monitoring and surveillance of alcohol.

Some of these measures have been implemented in Brazil, highlighting the Action Plan to Combat Chronic Non-communicable Diseases (Brazil, 2011), which presents reduction targets of alcohol consumption and reports the best evidence for reducing alcohol use as recommended by WHO (WHO, 2008, 2011b, 2013; Brazil, 2011). They are: a) strengthen the implementation of pricing policy and raise taxes on products derived from tobacco and alcohol in order to reduce consumption; b) support the intensification of surveillance measures related to the sale of alcoholic beverages to minors (<18 years); c) strengthen educational measures of the School Health Program (PSE) to prevent and reduce tobacco use and alcohol abuse; d) support local initiatives to control the sale of alcohol, establishing sales break time for bars and similar places.

Other important public policy measures consist of banning drinking and driving (Brazil's Dry Law - Brazil, 2008; New Dry Law - Brazil, 2012), which has already resulted in the reduction of alcohol consumption for those who drive (Moura et al,, 2011; Malta et al., 2014d). More recently, other initiatives are the Life in Traffic Project, a partnership involving the Ministry of Health, the National Traffic Department, the Ministry of Justice, PAHO, WHO, Bloomberg Foundation, among others, to reduce traffic accidents, and the Plan for the Decade for Road Safety (Brazil, 2010; Morais, 2013).

Depending on the best available evidence, published by WHO (2008) for the control of alcohol, especially among adolescents, such as actions in public health, society must deepen the debate on the measures to raise taxes of products, restrict access to alcoholic beverages sold, ban on alcohol advertising, promote and sponsor drinks as well as the supervise the measures adopted.

Brazilian law bans advertising only of drinks with an alcohol content above 13 degrees Gay Lussac. Thus, beer advertisements may be transmitted freely, and children and adolescents are continuously exposed to the marketing of these drinks, which can contribute with high prevalence in these age groups (Vendrame et al., 2009). Brazil has experienced important successes in tobacco regulatory policy, which contributed to the reduction of prevalence (Brazil, 2013a), especially among young people (IBGE, 2009). To obtain the same results in the reduction of alcohol use, among young people and vulnerable populations, it is important to move forward in the regulatory debate, especially in beer advertising ban, since the advertising of alcohol among children and youth stimulates consumption (Vendrame et al., 2009).

It becomes important the debate involving government, legislative, health and education professionals, society, families and young people in order to advance on public policy and a regulatory framework for alcoholic beverages.

References

Anderson, P; Chisholm, D; Fuhr, D. **Effectiveness and cost-effectiveness of policies and programmes to reduce the harm caused by alcohol**. The Lancet, v. 373, n. 9682, p. 2234–2246, 2009.

Bagnardi, V et al. **Does drinking pattern modify the effect of alcohol on the risk of coronary heart disease? Evidence from a meta-analysis**. Journal of Epidemiology Community Health, v. 62, n. 7, p. 615–619, 2008.

Brasil. **Lei nº 11.705, de 19 de junho de 2008**. Dispõe sobre o consumo de bebida alcoólica por condutor de veículo automotor, e dá outras providências. Diário Oficial [da] República Federativa do Brasil, Poder Executivo, Brasília, DF, 20 jun. 2008.

Brasil. Ministério da Saúde. **Projeto Vida no Trânsito**. Brasília: Ministério da Saúde, 2010. Available at: http://scielo.iec.pa.gov.br/pdf/ess/v22n3/v22n3a19.pdf. Acessed on: 10 abr. 2012.

Brasil. Ministério da Saúde. **Plano de ações estratégicas para o enfrentamento das doenças crônicas não transmissíveis (DCNT) no Brasil 2011-2022**. Brasília: Ministério da Saúde, 2011.

Brasil. **Lei nº 12.760, de 20 de dezembro de 201**2. Altera a Lei nº 9.503, de 23 de setembro de 1997, que institui o Código de Trânsito Brasileiro. Diário Oficial [da] República Federativa do Brasil, Poder Executivo, Brasília, DF, 21 dez. 2012.

Brasil. Ministério da Saúde. **Vigitel 2013: Vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico**. Brasília: Ministério da Saúde, 2013a.

Brasil. Ministério da Saúde. **Sistema de vigilância de violências e acidentes (Viva): 2009, 2010 e 2011**. Brasília: Ministério da Saúde, 2013b.

Camargo, CA; Rimm, EB. Epidemiologic research on moderate alcohol consumption and blood pressure. In: Sahkari, MW (Ed.). **Alcohol and the cardiovascular system**. Bethesda: National Institute on Alcohol Abuse and Alcoholism, U.S. Department of Health and Human Services, 1996.

Committee on Substance Abuse. **Alcohol use by youth and adolescents: a pediatric concern**. Pediatric, v. 125, n. 5, p. 1078-1087, 2010.

Cooper, ML. **Alcohol use and risky sexual behavior among college students and youth: evaluating the evidence**. Journal of Studies on Alcohol and Drugs, Supplement n. 14, p. 101-117, 2002.

Corrao, G et al. **A meta-analysis of alcohol consumption and the risk of 15 diseases**. Preventive Medicine, v. 38, n. 5, p. 613–619, 2004.

Doll, R et al. Alcoholic beverages and cancers of the digestive tract and larynx. In: Verschuren, PM (Ed.). **Health issues related to alcohol consumption**. Brussels: ILSI Europe, 1993. p. 125-166.

Duailibi, S et al. **The effect of restricting opening hours on alcohol related violence**. American Journal Public Health, v. 97, n. 12, p. 2276-80, dez. 2007.

Duffy, S; Sharples, L. Alcohol and cancer risk. In: Duffy, J (Ed.). **Alcohol and Illness**. Edinburgh: Edinburgh University Press, 1992.

English, DR et al. **The quantification of drug caused morbidity and mortality in Australia**. Canberra: Commonwealth Department of Human Services and Health, 1995.

IBGE. **Pesquisa Nacional de Saúde do Escolar (PeNSE) 2009**. Rio de Janeiro: IBGE, 2009.

IBGE. **Pesquisa Nacional de Saúde**. v. I. Rio de Janeiro: IBGE, 2014.

Iglesias, V et al. **Consumo precoz de tabaco y alcohol como factores modificadores del riesgo de uso de marihuana**. Revista de Saúde Pública, v. 41, n. 4, p. 517-522, 2007.

Malta, DC et al. **Prevalência do consumo de álcool e drogas entre adolescentes: análise dos dados da Pesquisa Nacional de Saúde Escolar**. Revista Brasileira de Epidemiologia, v. 14, supl. 1, p. 136-146, 2011. Available at: http://dx.doi.org/10.1590/S1415-790X2011000500014. Acessed on: 05 mar. 2015.

Malta, DC et al. **Uso de substâncias psicoativas, contexto familiar e saúde mental em adolescentes brasileiros**. Pesquisa Nacional de Saúde dos Escolares (PeNSE 2012). Revista Brasileira de Epidemiologia, v. 17, supl. 1, p. 46-61, 2014a. Available at: http://www.scielo.br/scielo.php?pid=S1415-790X2014000500046&script=sci_arttext&tlng=pt. Acessed on: 05 mar. 2015.

Malta, DC et al. **Consumo de álcool entre adolescentes brasileiros segundo a Pesquisa Nacional de Saúde Escolar (PeNSE 2012)**. Revista Brasileira de Epidemiologia, v. 17, supl. 1, p. 203-214, 2014b. Available at: http://www.scielo.br/scielo.php?pid=S1415-790X2014000500203&script=sci_arttext&tlng=pt. Acessed on: 05 mar. 2015.

Malta, DC et al. **Exposição ao álcool entre escolares e fatores associados**. Rev. Saúde Pública, São Paulo, v. 48, n. 1, fev. 2014c. Available at: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-89102014000100052&lng=en&nrm=iso. Acessed on: 05 mar. 2015.

Malta, DC et al. **Consumo de bebidas alcoólicas e direção de veículos, balanço da lei seca, Brasil 2007 a 2013**. Revista de Saúde Pública, São Paulo, v. 48, n. 4, ago. 2014d. Available at: http://dx.doi.org/10.1590/S0034-8910.2014048005633. Acessed on: 05 mar. 2015.

Mascarenhas, MDM et al. **Consumo de álcool entre vítimas de acidentes e violências atendidas em serviços de emergência no Brasil, 2006 e 2007**. Ciência & Saúde Coletiva, v. 14, n. 5, p. 1789-96, 2009.

Monteiro, MG. **Alcohol y salud pública en las Américas: un caso para la acción**. Washington, D.C.: Opas, 2007.

Morais, NOL de et al. **Projeto Vida no Trânsito: avaliação das ações em cinco capitais brasileiras, 2011-2012**. Epidemiologia e Serviços de Saúde, v. 22, n. 3, p. 373-382, set. 2013. Available at: http://dx.doi.org/10.5123/S1679-49742013000300002. Acessed on: 05 mar. 2015.

Moura, EC et al. **Direção de veículos motorizados após consumo abusivo de bebidas alcoólicas, Brasil, 2006 a 2009**. Revista de Saúde Pública, v. 43, n. 5, p. 891-894, 2011.

Mukamal, KJ et al. **Alcohol consumption and cardiovascular mortality among US adults, 1987 to 2020**. Journal of the American College of Cardiology, v. 55, p. 1328–1335, 2010.

National Highway Traffic Safety Administration. **A review of the literature on the effects of low doses of alcohol on driving-related skills**. 2008. Available at: http://www.nhtsa.dot.gov. Acessed on: 22 jan. 2008.

Paiva, FS; Ronzani, TM. **Estilos parentais e consumo de drogas entre adolescentes: revisão sistemática**. Psicologia em Estudo, v. 14, n. 1, p. 117-183, 2009.

Rehm, J et al. **The relation between different dimensions of alcohol consumption and burden of disease: an overview**. Addiction, v. 105, n. 5, p. 817–843, 2010.

Roerecke, M; Rehm, J. **Irregular heavy drinking occasions and risk of ischemic heart disease: a systematic review and meta-analysis**. American Journal of Epidemiology, v. 171, n. 6, p. 633–644, 2010.

Ronksley, PE et al. **Association of alcohol consumption with selected cardiovascular disease outcomes: a systematic review and meta-analysis**. British Medical Journal, v. 342, p. d671, 2011.

Sociedade Brasileira de Cardiologia. **V Diretrizes Brasileiras de Hipertensão**. Arquivos Brasileiros de Cardiologia, v. 89, n. 3, p. 1-48, 2006.

Statacorp. **Stata statistical software: release 11**. College Station, TX: StataCorp LP, 2009.

Stueve, A; O'Donnell, LN. **Early alcohol initiation and subsequent sexual and alcohol risk behaviors among urban youths**. American Journal of Public Health, v. 95, n. 5, p. 887-893, 2005.

Vendrame, A et al. **Apreciação de propagandas de cerveja por adolescentes: relações com a exposição prévia às mesmas e o consumo de álcool**. Cadernos de Saúde Pública, v. 25, n. 2, p. 359-365, 2009.

Wannamethee, SG; Shaper, AG. **Patterns of alcohol intake and risk of stroke in middle-aged British men**. Stoke, v. 27, n. 6, p. 1033-1039, 1996.

WHO. **International guide for monitoring alcohol consumption and related harm**. Geneva: WHO, 2002.

WHO. **Strategies to reduce the harmful use of alcohol**. Geneva: WHO, 2008. Available at: http://apps.who.int/gb/ebwha/pdf_files/A61/A61_13-en.pdf. Acessed on: 10 abr. 2013.

WHO. **Evidence for the effectiveness and cost-effectiveness of interventions to reduce alcohol-related harm**. Copenhagen: WHO Regional Office for Europe, 2009.

WHO. **Global status report on alcohol and health**. Geneva: WHO, 2011a.

WHO. **Global status report on non-communicable diseases 2010**. Geneva: WHO, 2011b.

WHO. **Global Action Plan for the Prevention and Control of NCDs 2013-2020**. 10 ed. Geneva: WHO, 2013. 55p. Available at: http://www.who.int/nmh/events/ncd_action_plan/en/. Acessed on: 27 jan. 2014.

Xin, X et al. **Effects of alcohol reduction on blood pressure. A meta-analysis of randomized controlled trials**. Hypertension, v. 38, n. 5, p. 1112-1117, 2001.

Yuan, JM; Ross, R; Gao, YT. **Follow up study of moderate alcohol intake and mortality among middle aged men in Shanghai, China**. British Medical Journal, v. 314, n. 7073, p. 18-23, 1997.

Appendix

Table 1. Percentage* of individuals who, over the past 30 days, consumed four or more doses (women) or five or more doses (men) of alcohol in a single occasion in the whole adult population (≥ 18 years) of the Brazilian state capitals and the Federal District, by sex, age and years of schooling

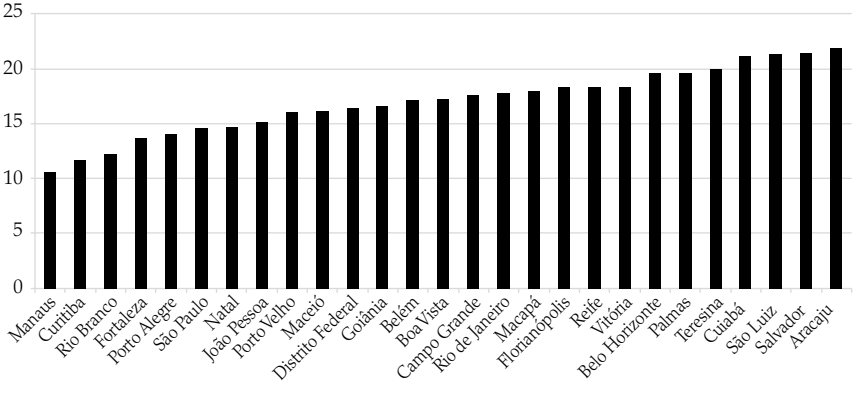
Variables	Total				Sex							
					Male				Female			
	%	95% IC			%	95% IC			%	95% IC		
Age (years)												
18 to 24	19.0	17.1	-	20.8	23.3	20.5	-	26.0	14.3	11.9	-	16.7
25 to 34	22.7	21.0	-	24.3	31.6	28.9	-	34.3	13.8	12.0	-	15.7
35 to 44	17.5	16.0	-	19.0	27.1	24.3	-	29.9	9.8	8.4	-	11.1
45 to 54	15.0	13.6	-	16.4	22.6	20.0	-	25.2	8.9	7.5	-	10.3
55 to 64	10.5	9.3	-	11.7	17.6	15.1	-	20.0	5.5	4.5	-	6.5
65 to mais	4.0	3.1	-	4.8	7.8	5.8	-	9.8	1.5	0.9	-	2.1
Years of schooling												
0 to 8	12.8	11.7	-	14.0	20.2	18.2	-	22.3	6.4	5.3	-	7.4
9 to 11	17.5	16.5	-	18.6	25.4	23.6	-	27.1	10.6	9.4	-	11.7
12 and more	19.7	18.4	-	21.0	28.4	26.1	-	30.6	13.0	11.5	-	14.4
Total	16.4	15.7	-	17.0	24.2	23.0	-	25.4	9.7	9.0	-	10.4

Source: Brasil, 2013a.

Note: * Percentage weighted to adjust the sociodemographic distribution of the VIGITEL sample to the distribution of the adult population of each city projected for the year 2013 (see Methodological Aspects).

95% CI: 95% of confidence interval.

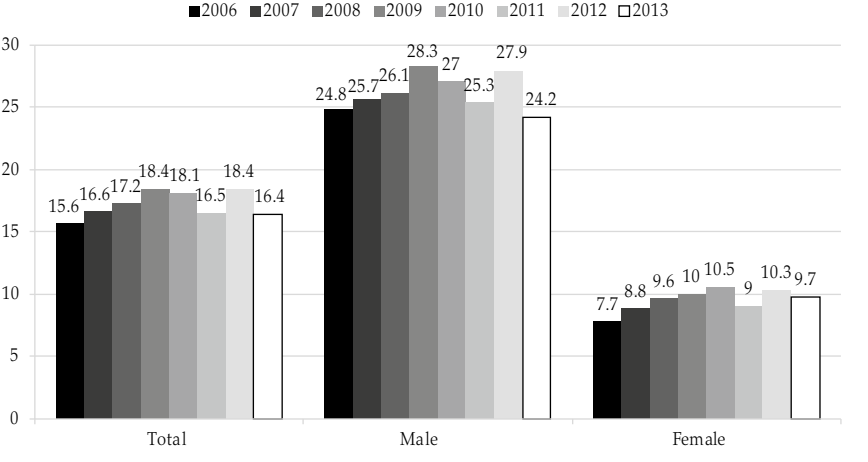
Figure 1. Percentage of adults presenting abusive consumption of alcohol in the last 30 days, according to the Brazilian state capitals and the Federal District



Source: Brasil, 2013a.

Note: 95% CI: 95% of confidence interval.

Figure 2. Evolution of the frequency of adults who reported excessive consumption of alcohol, by sex, VIGITEL 2006-2013



Source: Brasil, 2013a, and Malta et al., 2014d. [47]

Observation: $p < 0.05$ – Significant reduction in both sexes and among men (2007-2013).

Figure 3. Evolution of the frequency of adults who reported driving after excessive consumption of alcohol, by sex, VIGITEL 2006-2013

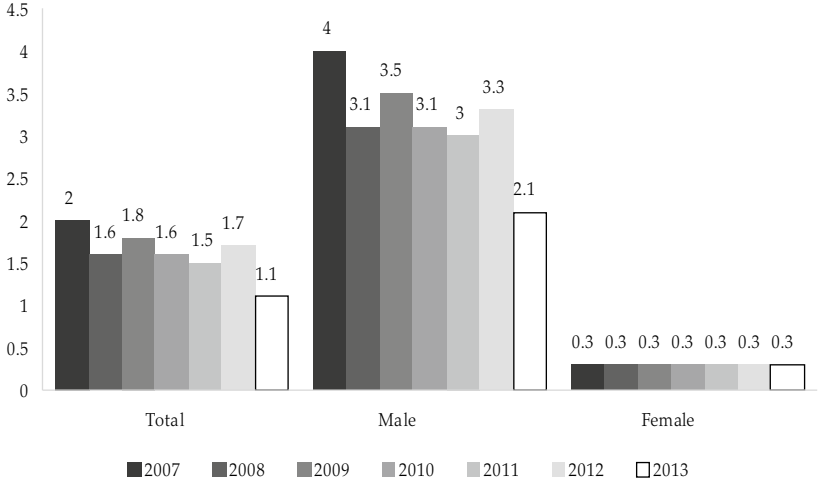


Table 2. Proportion of people of 18 years or older who reported alcohol abuse in the last 30 days preceding the survey, by sex, indicating a 95% confidence interval, according to the major regions, the units of the Federation and the household situation (2013)

Major regions, units of the Federation and household situation	Proportion of people of 18 years or older who reported alcohol abuse in the last 30 days preceding the survey (%)								
	Total			Sex					
				Male			Female		
	Proportion	95% confidence interval		Proportion	95% confidence interval		Proportion	95% confidence interval	
		Inferior limit	Superior limit		Inferior limit	Superior limit		Inferior limit	Superior limit
Brazil	13.7	13.1	14.2	21.6	20.7	22.5	6.6	6.1	7.1
Urban	14.2	13.6	14.8	22.3	21.3	23.4	7.1	6.6	7.7
Rural	10.3	9.2	11.3	17.3	15.4	19.1	2.9	2.2	3.5
North	14.2	12.9	15.4	23.1	20.8	25.4	5.7	4.9	6.5
Rondônia	11.1	9.2	13.1	17.7	14.5	20.8	4.9	2.9	6.8
Acre	12.4	10.7	14.1	17.6	14.4	20.7	7.7	5.9	9.5
Amazonas	13.4	11.8	15.1	22.9	19.9	25.9	4.4	3.1	5.7
Roraima	13.4	11.3	15.6	22.1	18.0	26.2	5.0	3.5	6.5
Pará	14.8	12.4	17.1	24.6	20.1	29.1	5.4	4.1	6.7
Amapá	17.6	14.6	20.6	25.7	21.0	30.5	10.2	6.8	13.5
Tocantins	15.9	12.8	18.9	24.0	18.9	29.1	8.2	5.6	10.8
Northeast	15.6	14.8	16.4	25.5	24.0	27.0	6.8	6.0	7.7
Maranhão	13.0	10.9	15.0	21.3	17.3	25.2	5.3	3.4	7.3
Piauí	17.0	14.9	19.2	28.5	24.5	32.5	6.4	4.8	8.0
Ceará	14.2	12.2	16.2	24.4	20.8	28.0	5.0	3.6	6.4
Rio Grande do Norte	16.5	14.7	18.2	28.7	24.7	32.7	5.8	4.1	7.4
Paraíba	10.9	9.3	12.5	18.3	15.3	21.3	4.5	2.8	6.2
Pernambuco	15.1	13.0	17.2	24.4	20.3	28.4	7.0	5.2	8.8
Alagoas	14.7	12.6	16.7	25.2	21.1	29.2	5.7	3.9	7.4

Major regions, units of the Federation and household situation	Proportion of people of 18 years or older who reported alcohol abuse in the last 30 days preceding the survey (%)								
	Total			Sex					
				Male			Female		
	Proportion	95% confidence interval		Proportion	95% confidence interval		Proportion	95% confidence interval	
		Inferior limit	Superior limit		Inferior limit	Superior limit		Inferior limit	Superior limit
Sergipe	15.1	13.1	17.1	24.3	20.5	28.2	6.6	4.6	8.6
Bahia	18.9	16.8	20.9	29.4	25.6	33.2	9.7	7.2	12.1
Southeast	12.8	11.9	13.7	19.9	18.2	21.5	6.6	5.8	7.5
Minas Gerais	14.0	11.7	16.3	21.1	17.2	25.0	7.6	5.6	9.6
Espírito Santo	11.5	9.3	13.7	17.4	14.0	20.9	6.1	3.5	8.6
Rio de Janeiro	13.5	11.8	15.1	19.7	16.7	22.7	8.3	6.8	9.8
São Paulo	12.1	10.9	13.4	19.5	17.2	21.9	5.6	4.5	6.7
South	11.1	10.0	12.2	17.6	15.6	19.6	5.2	4.2	6.2
Paraná	10.6	8.9	12.2	16.5	13.3	19.7	5.2	3.5	7.0
Santa Catarina	11.4	8.4	14.3	17.3	12.5	22.0	5.7	3.2	8.3
Rio Grande do Sul	11.4	9.8	13.0	18.9	16.0	21.9	4.8	3.4	6.2
Midwest	16.2	15.0	17.3	24.0	22.0	25.9	9.0	7.9	10.2
Mato Grosso do Sul	18.4	16.1	20.6	27.7	23.7	31.6	9.9	7.7	12.1
Mato Grosso	14.0	11.9	16.2	22.8	18.9	26.7	5.5	3.6	7.4
Goiás	16.6	14.5	18.8	22.9	19.4	26.4	10.9	8.6	13.1
Distrito Federal	15.5	13.6	17.4	24.6	21.0	28.2	8.0	6.3	9.7

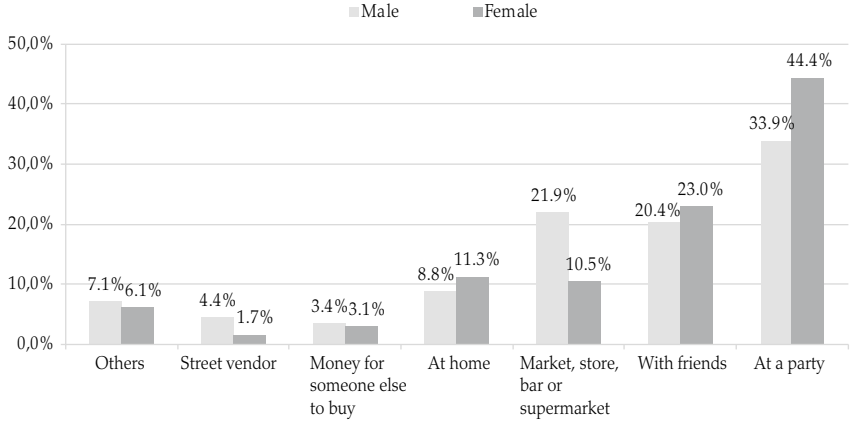
Source: IBGE, 2014.

Table 3. Prevalence and respective 95% CI of situations related to alcohol consumption, according to sex and school administrative dependence

Situations related to alcohol consumption	Total		Sex				School administrative dependence			
			Male		Female		Private		Public	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Try drinks	66.6	(64.0 – 69.2)	64.8	(61.4 – 68.1)	68.3	(66.2- 70.4)	71.3	(67.3 – 75.3)	65.6	(63.1 – 68.2)
Experiment one dose	50.3	(49.0 – 51.6)	48.7	(46.6 – 50.8)	51.7	(50.8- 52.6)	47.4	(46.0 – 48.9)	50.9	(49.6 – 52.2)
Drink on the last 30 days	26.1	(24.5 – 27.7)	25.2	(23.0 – 27.5)	26.9	(25.7- 28.0)	23.0	(21.3 – 24.6)	26.7	(25.2 – 28.3)
Intoxication	21.8	(21.1 – 22.5)	22.8	(22.0 – 23.7)	20.9	(20.1- 21.6)	18.6	(17.8 – 19.3)	22.5	(21.7 – 23.2)
Family would mind	92.2	(92.0 – 92.3)	91.3	(91.0 – 91.5)	93.0	(92.7- 93.3)	93.0	(92.2 – 93.8)	92.0	(91.7 – 92.2)
Having family problems	10.0	(8.9 – 11.1)	9.5	(9.0 – 10.0)	10.4	(8.7- 12.2)	8.4	(7.8 – 9.1)	10.3	(9.1 – 11.6)

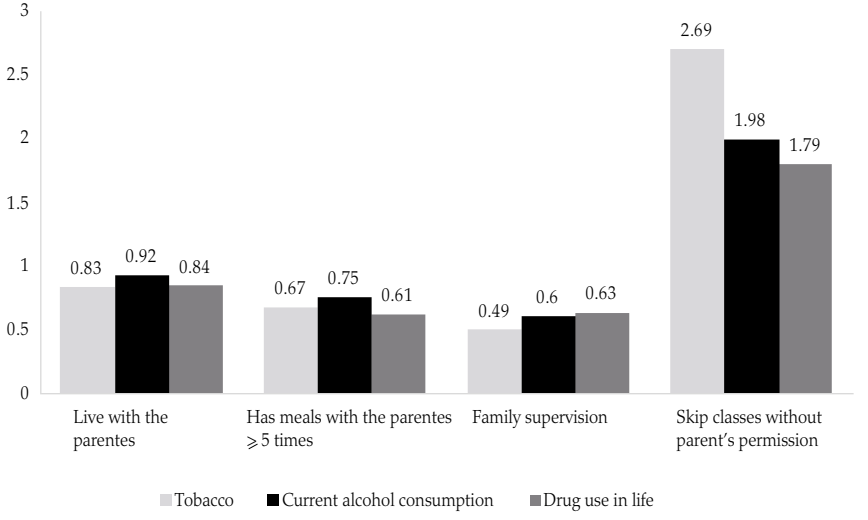
Source: Malta et al., 2014.

Figure 4. Place of purchase of alcohol among students of the 9th year of secondary school who reported use in the last 30 days, by gender



Source: Malta et al., 2014.

Figure 5. Influence of family background in the use of psychoactive substances



Source: Malta et al., 2014a.

Table 4 . Proportion (%) that declared alcohol consumption among victims of accidents and violence attended in sentinel urgency and emergency services, according to demographic characteristics. Selected cities and the Federal District – Brazil, 2011

Demographic characteristics	2011		
	Accidents	Violence	Total
Sex			
Male	14.6	50.3	18.7
Female	5.7	28.8	7.7
Age (years)			
18 – 29	12.7	43.3	16.6
30 – 59	12.2	45.7	15.6
60 and more	4.5	34.9	5.8

Demographic characteristics	2011		
	Accidents	Violence	Total
Race/color			
White	8.4	36.4	10.8
Black/mulatto	13.0	46.5	16.9
Yellow/indigenous	10.9	52.5	14.9
School (years)			
0 – 4	11.7	49.3	15.6
5 – 8	12.4	45.3	16.5
9 – 11	9.9	39.1	12.5
12 and +	8.5	28.1	10.0
Type of accident			
Transport accident	19.6	-	-
Fall	10.2	-	-
Burning	3.5	-	-
Other accidents[a]	5.0	-	-
Type of violence			
Assault/abuse[b]	-	45.2	-
Self-harm	-	33.8	-
Total	11.4	44.1	14.9

Source: Brasil, 2013b.

a) Includes: suffocation/choking, foreign body, drowning, poisoning/intoxication, injury by sharp object, injury by firearms, animal accidents, falling objects on the person, collision with object/person, sprain, crushing.

b) Includes intervention by public law official.